

SUMMARY
BIOLOGICAL OPINION ON THE EFFECTS TO
WOUNDFIN AND VIRGIN RIVER CHUB
FROM THE PROPOSED PLACEMENT OF KELLNER JACKS AND RIPRAP IN THE
BEAVER DAM WASH, MOHAVE COUNTY, ARIZONA

Date of the opinion: July 22, 1996

Action agency: Natural Resources Conservation Service

Proposal: To place two lines of Kellner jacks and a section of riprap along the banks of Beaver Dam Wash for bank stabilization.

Species affected: Woundfin (Plagopterus argentissimus) and Virgin River chub (Gila robusta seminuda) and their proposed critical habitat in the Virgin River.

Biological opinion: Non-jeopardy, no destruction or adverse modification of proposed critical habitat.

Incidental take statement

Level of take anticipated: Risk of take is from increased sedimentation in downstream areas and in loss of individuals of either species if diversion from the work site is needed. Completion of the project may have effects over the long term to stability of up and downstream reaches.

Reasonable and prudent measures: Three RPMs are included. The first addresses future changes to flow events that may occur because of the project, the second addresses the effects to individual fish in the areas and the third deals with the effects of uncoordinated bank stabilization.

Terms and conditions: For RPM 1, NRCS will examine the effects of this project in planning future projects and will give preference to solutions that do not continue or exacerbate present conditions. For RPM 2, NRCS will implement a sediment control program, survey for fish before any diversion is made with the diversion being barriered from fish and as short as possible and a program to reduce the risk of hazardous waste accessing the wash will be implemented. For RPM 3, NRCS will coordinate projects with the Corps of Engineers to address watershed needs and will report on this project and the implementation of the terms and conditions to the Service.

Conservation recommendations: No conservation recommendations were made.



United States Department of the Interior
Fish and Wildlife Service

Arizona Ecological Services Field Office
2321 W. Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
(602) 640-2720 Fax (602) 640-2730



In Reply Refer To:
AESO/SE
2-21-95-F-415

July 22, 1996

Mr. Humberto Hernandez
Natural Resources Conservation Service
3003 North Central Avenue Suite 800
Phoenix, Arizona 85012-2945

Dear Mr. Hernandez:

The U.S. Fish and Wildlife Service has reviewed the Biological Evaluation (BE) submitted by the Natural Resources Conservation Service for the Lower Beaver Dam Wash Project, Mohave County, Arizona. Your August 17, 1995, request for formal consultation was received on August 21, 1995. Additional information was requested from NRCS and was received May 17, 1996. This document represents the Service's biological opinion on the effects of that action on endangered woundfin (Plagopterus argentissimus) and endangered Virgin River chub (Gila robusta seminuda) in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). Withdrawal of the proposal to list the Virgin spinedace (Lepidomeda mollispinis) removes any conferencing requirement for that species (61 FR 4401). Proposed critical habitat for the woundfin and Virgin River chub includes the mainstem Virgin River and those portions of the 100-year floodplain that contain the constituent elements. Portions of the Virgin River 100-year floodplain extend up Beaver Dam Wash but do not reach the project area.

We were not asked for concurrence with your no effect determinations for the peregrine falcon (Falco peregrinus anatum), desert tortoise (Gopherus agassizii), and Southwestern willow flycatcher (Empidonax extimus traillii). With respect to the desert tortoise, the proposed action states that if a desert tortoise was found during construction, it would be moved. Such an action constitutes take. Without formal consultation authorizing incidental take, the action is not lawful and should be stricken from your project description. If a tortoise is found, it must be avoided and take must not occur. We are also concerned about the location of the quarrying site for the riprap material. If the quarry site is in desert tortoise habitat, then there could be interrelated effects of this action warranting consultation. If vehicles would be moving material across occupied desert tortoise habitat to the construction site, take could occur. Such take could only be authorized through an incidental take statement in a formal consultation. NRCS should keep this in mind while implementing the project to ensure it has no effect on the desert tortoise. With respect to the Southwestern willow flycatcher, present habitat was assessed and potential habitat was not assessed. The project is likely to have interrelated effects downstream and possibly upstream that could affect survival and recovery of the species, through changes in the

potential to produce suitable habitat for the species. We did not see such an analysis in the biological evaluation.

This biological opinion is based on information provided in the August 17, 1995, BE and May 17, 1996, addendum, telephone conversations between NRCS and Service personnel, documents from the Clean Water Act (CWA) section 404 investigations, and other sources of information. The literature cited in this biological opinion does not represent a complete bibliography of all literature on the species listed above or the effects of Kellner jack and rip rap installation and operation on those species. A complete administrative record of this consultation is on file in the Arizona Ecological Services Office.

This biological opinion contains an analysis and conclusion for NRCS actions only. The proposed project may require a permit from the Corps of Engineers under section 404 of CWA. The requirements for project approval in the CWA are not the same as those for the ESA for project evaluation. If the project is altered as a result of requirements of section 404, and those alterations are included in the permit for the project, then effects of the issuance of that permit by the Corps is not covered by this opinion and the accompanying incidental take statement. Additional section 7 compliance may then be needed for the proposed permit issuance. The findings of this biological opinion are the result of the analysis of the project as proposed by NRCS and does not mean the Service views the proposed action as the most environmentally suitable or represents our complete response for CWA issues relating to this project.

CONSULTATION HISTORY

High water events of March 1995 resulted in displacement of the Kellner jacks at the Draper residence on the east/north side of the wash, caused some damage to the east/north bank immediately below the highway bridge and affected part of the west/south bank north of the Kellner jack line put in to deal with the 1993 high water damage.

The March 1995 high water event resulted in NRCS evaluating projects for the Draper residence and the Resort golf course under the EWP program. These are the projects under consultation in this biological opinion. The Service received the request for consultation on August 21, 1995. Additional information for the BE was requested and received on May 17, 1996.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Flooding in March 1995 along Beaver Dam Wash resulted in eroded streambanks along private property on both banks of the channel below the Highway 91 bridge near Littlefield, Arizona, Mohave County, Arizona, on the Beaver Dam Estates including the Draper residence and Beaver Dam Resort. Following a site review in April 1995, the NRCS determined that these proposed projects would be eligible for the EWP program as they believed that the near term hazard to

life or property was high enough to constitute a continued hazard. According to the BE, additional high flows through this area would result in further damage to property in the area.

Under the EWP program, NRCS proposes to install Kellner jacks on both banks of Beaver Dam Wash downstream of the Highway 91 Bridge, and install rock rip rap on the east/north bank at the Draper residence downstream of the new Kellner jacks. The intent of the project is to prevent erosion of vertical soil banks from the effects of low flows. High flows continue to be able to use the existing floodplain. The Kellner jacks installed on the west/south bank would be placed next to the vertical bank in the active channel of the wash. The upstream end of this line of jacks would begin at the downstream end of existing willow trees and continue downstream for 870 feet to an additional patch of willow trees. The jacks would be anchored into the bank behind the wash using concrete anchor blocks. The Kellner jacks installed along the east/north bank would lie next to the curving vertical bank at the Beaver Dam Wash Estates subdivision, and would also be within the active wash channel. This string of jacks would be 738 feet in length. Anchors for this string of jacks would be buried in the bank behind the jack string. The upper end of the string would begin at the small patch of willow trees next to the Highway 91 bridge and continue downstream to an existing patch of cottonwood trees.

Each individual jack is constructed of three legs of angle iron that are welded or bolted together and laced with No. 6 galvanized wire. Each jack is attached to the main line cable with 1/2 inch galvanized steel cable. The jacks are placed on eight foot centers. The string of jacks is attached to an anchor block constructed of a cement block 19 inches thick with one inch galvanized wire.

Rock rip-rap at the Draper residence would be placed on the east/north bank downstream of the new Kellner jacks, and would be separated from them by the existing cottonwood trees. Approximately 405 feet of rip rap would be installed. Placement of rip-rap would require a toe trench to be excavated in the channel. The trench would be five feet wide at its base, and five feet in depth. The angle of the inner sidewall, between the trench bottom and the wash bottom, would be 1:1. The angle of the outer sidewall of the trench from the trench bottom up past the vertical bank would be 1.5:1 (horizontal:vertical). Geotextile fabric would be applied to the trench, with rock placed on top of the fabric to fill the trench. Riprap placed with the trench would be wider at the bottom and narrower at the top, resulting in a finished side channel slope of 2:1 (horizontal:vertical). From top to bottom, the rip-rapped area would be approximately 10 feet in height.

Rip-rap would be placed on a backfilled area. This backfill would be placed up against the existing vertical bank and beneath the rip-rap. According to engineering drawings provided in the BE and incorporated herein by reference, the area to be backfilled extends approximately half-way down toward the trench from the top of the vertical bank.

No trees would be removed for installation of the jacks. No trenches or pads would be required for jack installation. Existing sandbars and gravel banks will be left undisturbed. The Kellner jacks would be constructed away from water, and would be placed on dry sand. No equipment

or work will be completed within water; however, if the stream is running next to the bank it may need to be diverted in order to minimize sedimentation. There was no information presented in the BE or addendum that described the diversion.

Cottonwood (Populus sp.) and willow (Salix sp.) will be planted in conjunction with both strings of jacks. These trees will be of a species and stock native to the project area. No trees will be planted in the area of riprap.

DESCRIPTION OF THE ACTION AREA

Beaver Dam Wash heads in Nevada, flowing through Utah to its confluence with the Virgin River in Arizona. The stream is perennial, however portions may be dewatered during low flows especially in areas with diversions from the stream. High water events are common and contribute to the complexity of the stream morphology, aquatic habitats, and riparian values. In the vicinity of the project, the wash is perennial and is fed by springs above the old State route 91 bridge. There are several diversions from this wash, and one reservoir, Schroeder Reservoir, near the headwaters in Nevada.

The immediate project area is private land. The west/south side of Beaver Dam Wash in the project area is a golf course. The east/north side is a housing development, with one house located immediately adjacent to the area proposed for riprap.

Beaver Dam Wash below the proposed project area is public land managed by the Bureau of Land Management and is included in the Virgin River Corridor Area of Critical Environmental Concern and Special Recreation Management Area. The confluence of Beaver Dam Wash with the Virgin River is included in the river reach deemed eligible for wild and scenic river designation under the recreational classification. Water quality in the wash is high and it may qualify as a unique water under Arizona water law.

Biotic resources in Beaver Dam Wash include riparian areas with mature cottonwood-willow gallery forests, wetlands, and aquatic habitats. Scientific studies have documented the value of riparian habitats to wildlife in arid land regions. Although affected by upstream water diversions, flows and water quality in the wash do support a fish fauna containing both native and introduced species.

While the proposed action must stand by itself, to evaluate the effects of the proposed action requires a review of past activities in the wash including consultations and investigations concerning the actions taken by Beaver Dam Resort in Beaver Dam Wash since the mid 1980's. The following is a brief summary of recent events.

Work in the Beaver Dam Wash channel was done in conjunction with construction of the Highway 91 bridge in 1951. Additional work on the channel in the vicinity of the present project area was done in the late 1970's that may have included aligning the channel and placing

berms below the highway bridge. Whether this work was in the proposed project area is not clear. High water events were recorded in 1980 and 1983, but we do not have a record of any work done on the channel subsequent to these events.

In 1989, Beaver Dam Golf Incorporated initiated an extensive project to realign and channelize the wash to provide for an estimated 12,000 cubic feet per second flow through the area. The project did not have the required permits from the Corps under section 404 of the CWA. The operation involved the removal of material from the wash to form berms and to fill, grade and contour part of the area intended for the golf course. These actions took place on property owned by the Resort. Actions were also taken on Bureau of Land Management lands downstream to remove materials deposited in the channel by the high flows resulting from the failure of Quail Creek dam on January 1, 1989. Also in 1989, the Resort announced it was putting a bridge across the wash to permit access to the portion of the golf course on the east/north side of the wash. A railroad flatcar was subsequently placed in the wash channel to act as a temporary bridge. Three diversion dams were also constructed in the wash in 1989. Emergency work on some existing diversion dams was authorized under section 404 in 1992 but did not allow for bank stabilization beyond that needed for the integrity of the dams and related facilities.

The remediation plan for the unpermitted activities was approved in 1993 and required the removal of all illegally placed fill from the golf course area. Information from property owners on the east/north bank of the wash indicated that increased erosion on that bank had resulted from the unpermitted activities on the west/south bank by the Resort. These two issues were complicated by the high water event of January 18-19, 1993, that removed the flatcar bridge and eroded portions of the west/south bank containing the illegal fill. The Resort wished to reclaim the newly eroded area of the golf course lost to the high water, and was advised that such action would require a section 404 permit under the CWA.

As a result of the high water events of January 1993, the NRCS under the Emergency Watershed Protection (EWP) program proposed two projects in the area of Beaver Dam Wash under consideration. One was on the east/north side of the wash at the Draper property and the other was on the west/south bank at the Resort. The Resort proposal underwent formal section 7 consultation (file 2-21-94-F-388) and a biological opinion was issued on September 13, 1994. Two lines of Kellner jacks were placed in the wash, one along the new bank and the second in the channel where the pre-flood bank had been located. Although the stated purpose of the project did not include reclamation of the eroded area between the lines of jacks, if the jacks remain in place, sediments will likely build up behind them thus providing some measure of reclamation without the need for additional 404 oversight.

High water events of March 1995 resulted in displacement of the Kellner jacks at the Draper residence on the east/north side of the wash, caused some damage to the east/north bank immediately below the highway bridge and affected part of the west/south bank north of the Kellner jack line put in to deal with the 1993 damage. The high water also removed or damaged portions of the remediation project for the illegal fill and the Environmental Protection Agency

determined that further restoration activities or monitoring was not warranted under the circumstances.

Special status species that may be found in the general area of the proposed project include the endangered woundfin, Virgin River chub, peregrine falcon and southwestern willow flycatcher. Desert tortoise populations are located in the upland areas surrounding the wash.

STATUS OF THE SPECIES RANGEWIDE

The Virgin River basin has been subject to heavy modification by human activities. Historic flows in the river and its tributaries have been altered by diversions of water for agricultural and municipal uses. These alterations began in the early part of the 1900's. The construction of water storage dams on some tributaries has altered flows and changed water quality both in the tributary and the mainstem itself. Dams, large or small, also act as barriers to fish moving up and down stream and contribute to fragmentation of fish populations.

Woundfin

The woundfin was listed as an endangered species in 1970 under a precursor to the ESA. Critical habitat was proposed for portions of the mainstem Virgin River in 1995. Biological and distributional information on the woundfin is summarized in the Woundfin Recovery Plan (USFWS 1985) and the Virgin River Fishes Recovery Plan (USFWS 1995). These recovery plans are incorporated herein by reference.

The woundfin is a member of the tribe Plagopterini, the genus Plagopterus is monotypic. The woundfin is a small, silver minnow with a flat head and a conspicuous, sharp dorsal spine for which it was named. It is the most silvery of all American minnows, and reflects blue in bright sunlight. A wash of light-yellow at the bases of the pectoral and pelvic fins is the only breeding color noted. Woundfin rarely achieve a length of more than three inches (7.5 centimeters (cm)). The woundfin has a flattened head and belly and overall streamlined body shape, which are indicative of fish inhabiting swift, shallow, sand-bottomed streams. Woundfin are essentially scaleless, with the exception of small plates of bone situated in the leathery skin, especially near the nape.

Historic distribution of the woundfin included the Colorado, Salt, Verde, and Gila rivers in central and western Arizona in addition to the Virgin River and its tributaries. The woundfin is presently known only from the Virgin River drainage, all other populations have been extirpated. Woundfin from Virgin River stock have been transplanted by the Arizona Game and Fish Department into four different locations along the Hassayampa River, Salt River, Sycamore Creek, and Paria River. These efforts were unsuccessful. A captive population of woundfin was established in 1988 at the Dexter National Fish Hatchery and Technology Center in New Mexico (USFWS 1995).

Woundfin adults and juveniles are most often collected from runs and quiet waters adjacent to riffles, while juveniles use habitats which are generally slower and deeper than adults. Woundfin larvae are collected most frequently from backwaters or slow-velocity habitat along stream margins, often in association with dense growths of filamentous algae (USFWS 1995). In the Virgin River, woundfin are found most often in the main channel, although some use of tributary streams has been noted. Adults mostly use runs and quiet waters with sand or sand/gravel substrates located adjacent to riffles. Fry may be found in shallow areas next to the channel, while juvenile habitats resemble those of adults. Pools, which often contain predatory non-native fish species, are generally avoided by woundfin.

Woundfin are omnivorous, shifting their food habits in response to changing food availability. Food items as determined through stomach content analysis include filamentous algae, detrital material, tamarisk seeds, and insects (USFWS 1995).

The reproductive cycle of the woundfin appears to be initiated by some combination of increasing water temperature, lengthening daylight, and declining spring runoff. Spawning occurs during April to July, depending on the timing of the snow melt runoff, and late summer spawning in August has also been observed. Females leave pool habitat to join a group of males in swifter flowing water over cobble to gravel-sized substrates and return to the pool following spawning. Greger and Deacon (1982) found that, for spawning in an artificial stream system, the choice of substrates appeared to be fairly specific to cobble or gravel. Deacon and Hardy (1982) and Hardy and Deacon (1982) found that highest population densities and greatest spawning success occurred in more suitable habitats. Deacon and Hardy (1982) indicated that spawning failed in suboptimal habitats even when flow conditions were adequate. This indicates that when habitats are impacted by water diversions and other habitat modifications spawning success will be reduced (USFWS 1995).

Larvae are generally found in shallow areas lateral to the main current, but are absent from pools containing potential predators such as mosquitofish (Gambusia affinis), green sunfish (Lepomis cyanellus), largemouth bass (Micropterus salmoides), and Virgin River chub (USFWS 1995).

While Deacon and Hardy (1982) showed reduced survival of young woundfin at flows below 200 cfs, monitoring data compiled in the Virgin River Fishes Data Base indicated high initial survival below the Washington Fields Diversion near St. George, Utah, at flows less than 20 cfs (USFWS 1995). Deacon and Hardy (1982) showed that population density and structure were affected by both level of habitat destruction and flow conditions in the river. Reduced recruitment below major diversions has been attributed to water depletions. Deacon and Hardy (1982) further noted that when woundfin populations were severely depleted, such as during the 1977 drought, a two-year period of favorable water conditions was required to rebuild population densities.

Deacon and Hardy (1982) noted that mean monthly flows of 800 cfs or higher during the reproductive period resulted in diminished recruitment. High mortality has been associated with

periods of high discharge during late summer and early autumn due to stochastic thunderstorm events (T.J. Hickman and T.B. Hardy, unpubl. field notes). Additionally, Hardy *et al.* (1989) found that an average winter mortality of approximately 30 percent was observed and seemed to be independent of population density.

Little information presently exists on movement of woundfin. Downstream movement within the Virgin River by adults and other life stages has been noted (T.B. Hardy and J.E. Deacon, unpubl. data), but the extent of upstream movement, if any, is not known (USFWS 1995).

The status of woundfin populations in the Virgin River and its tributaries has not significantly improved since its listing as an endangered species. Population declines have been noted since 1984 (USFWS 1995). Physical habitat degradation has continued through the 1980's and into the 1990's. The spread of the red shiner, Cyprinella lutrensis, through the Virgin River drainage significantly reduces the value of the remaining habitats due to the competition for resources that occurs. Because woundfin are short-lived, yearly reproductive success is crucial to population maintenance. Creation of more suboptimal habitats will likely significantly affect reproductive success (USFWS 1995).

Conservation efforts by the Service, the Bureau and other entities taken as part of the recovery plan and biological opinion requirements have provided information on life history and distribution for use in the Bureau's Habitat Management Plans and red shiner eradication projects in the late 1980's. The eradication projects had some success at reducing or eliminating red shiner in some areas, however, there are no guarantees that the red shiner will not get back into the system.

The status of the woundfin remains precarious. Reintroduction in other portions of the historic range have not succeeded in establishing new populations. The recent development of a cooperative agreement for the recovery of the Virgin River spinedace may provide some benefits to the woundfin, but the extent of any possible benefit is not clear.

Virgin River chub

The Virgin River chub was listed as an endangered species in 1989. Although critical habitat had been included in the 1986 proposed rule, no critical habitat was designated at the time of listing. Designation of critical habitat was deferred pending the development of an economic analysis. The Service was sued by the Southern Utah Wilderness Alliance in 1993 after failing to designate critical habitat within the statutory time frames. Critical habitat was proposed for portions of the mainstem Virgin River in 1995. Biological and distributional information on the Virgin River chub is summarized in the Virgin River Fishes Recovery Plan (USFWS 1995) and is incorporated here by reference.

The Virgin River chub is a silvery minnow reaching eight to 18 inches (20 to 45 cm). Until recently, the Virgin River chub was considered a subspecies of the roundtail chub (Gila robusta) but is now considered a separate species, Gila seminuda. The species name seminuda refers to

the small, deeply imbedded scales on the back, breast and portions of the belly. They are difficult to see and may in fact be absent in some individuals. The species is still referenced as a sub-species on the list of threatened and endangered species until an official change of name is processed.

Historic distribution of the Virgin River chub was confined to the Virgin and Moapa River drainages downstream to the Colorado River. Present distribution is within the same two drainages. Construction and operation of Lake Mead inundated the confluence of the Virgin and Moapa Rivers so the two drainages are now separated from each other. A captive population is held at Dexter National Fish Hatchery and Technology Center (USFWS 1995).

Virgin River chubs are most commonly found in deep runs or pool habitats of slow to moderate velocities with instream cover (boulders, root snags) available. The larger individuals may be found in a wider range of water depths and velocities than smaller individuals. Little is known about the habitat preferences for larval and small juveniles.

An omnivorous feeder, the Virgin River chub diet shifts with age. Young fish are considerably more predaceous, feeding almost entirely on macroinvertebrates. Older, larger, fish feed on algae and debris. Diets do shift seasonally as well (USFWS 1995).

The spawning period includes the months of April to June, but the particulars are lacking. Little is known about the spawning requirements, but there may be some similarities with the woundfin since good spawning years appear to coincide.

There has been some data collected indicating that Virgin River chub do move downstream, but the evidence is limited. There is no information on upstream movements or any seasonal pattern of movement.

The status of Virgin River chub populations in the Virgin River has not significantly improved since its listing as an endangered species. Population declines have been noted since 1984 (USFWS 1995). Physical habitat degradation has continued through the 1980's and into the 1990's. Without additional information on life history needs, it is difficult to assess the total effect of these changes, but clearly they are significant. Based on available information, the status of the Virgin River chub is precarious. Because it is only known from the Virgin and Moapa Rivers, there is limited opportunity to re-establish populations in other parts of the historic range. The population in the Moapa River is not listed under the ESA, so it receives no protection through sections 7 or 9 of ESA. With the increasing need for water to support human developments in the region, the risk of losing the Moapa River population is significant. The recent development of a cooperative agreement for the recovery of the Virgin River spinedace may provide some benefits to the Virgin River chub, but the extent of any possible benefit is not clear.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation. Because the Virgin River and its tributaries provide the only remaining habitat for listed populations of the woundfin and Virgin River chub, the environmental baseline encompasses the present range of both listed species.

Status of the Species Within the Action Area

The history of water use and development along Beaver Dam Wash reflects such development elsewhere in the Virgin River basin. Construction of a reservoir and several diversion structures as well as channelization activities in the wash have altered flows and habitat conditions in the wash for native fish. There are no records for the woundfin in Beaver Dam Wash at the proposed project site but records exist for the river near the confluence. Records for the Virgin River chub exist for the wash below the project area and the river. The mainstem of the Virgin River at and below the confluence with Beaver Dam Wash provides important habitat for both species and has been proposed for designation as critical habitat. Because of the limited range of both species, status in the project area is not significantly different from the rangewide status.

Effects of the Action

The potential for direct effects to the woundfin and Virgin River chub from the placement of the Kellner jacks and riprap is limited due to the low probability that individuals of either species are in the wash at the project site. Water conditions, especially the levels of flows, at the time of the work would influence the probability of individuals being present. If all construction work is done out of the active channel and no diversion of water away from the work sites is needed, the potential for direct effects is further reduced. This assumes that access to both work areas is possible from the respective sides of the wash and there is no need to cross the stream to any work area. If there is a need for a water diversion, direct effects would include increased sedimentation, changes to available habitats and food resources in the area, possible stranding mortality, and mortality from crushing or other injury due to machinery in the wash channel.

Interrelated and interdependent actions are those actions that either have no utility without the proposed action or depend upon the larger action for their justification. The "but for" test is used to determine which actions qualify for this status so the effects of those actions are included in the analysis of effects. Based on the requirements of the EWP program, the Resort and housing developments this project is intended to protect may qualify for this status. If not for the presence of the recreational and residential developments, there would be no need for the proposed action. The effects of these developments on the wash are in the form of water

diversion, water quality of runoff and return flows, and past actions that have resulted in changes to the channel configuration to allow for the development. The continued presence of these developments ensures that these effects will continue into the future, perhaps requiring additional projects.

Indirect effects of the action are much more difficult to evaluate. Baseline conditions in Beaver Dam Wash are the result of past and continuing human activities on the watershed and especially along the wash itself. Activities that affect the natural hydrologic processes of the watershed contribute to changes in high water events that result in different patterns and levels of erosion and deposition. Examples include the watershed effects of construction of roads and buildings, conversion of lands to agriculture, livestock grazing, placement of dams and diversion structures, as well as such local events as construction of the Highway 91 bridge, narrowing of the channel by dikes and berms, changes to erosion on the east/south bank possibly due to relocation of the wash channel, and placement of the flatcar bridge at the Resort. The floods resulting from the failure of Quail Creek Dam on an upstream tributary of the Virgin River also had effects on processes in the wash. Delineating which changes to wash functions can be attributed to the implementation of the proposed project is extremely difficult. There will be some specific effects from the proposed action, but the history of activities in the watershed and the wash itself has created a complex pattern of existing conditions where it is difficult discern the cause of any particular event.

Activities on the watershed and along the wash have proceeded as individual, unrelated projects. Little to no comprehensive planning or analysis has been done to assess the wash as a whole. The proposed action would continue this piece-meal management direction and likely contribute to future problems in the channel. The NRCS states that they realize the proposed action does nothing to address the present situation for the wash. Instead it continues the series of patching efforts to look at local conditions without consideration of the larger condition. This is perhaps the most important indirect effect of this proposed action.

Many project effects appear unknown because a full-scale hydrologic assessment is lacking. The BE for the project states that the riprap portion of the project would reduce sediment loads in the stream by covering an eroding bank. This may indeed be the case, at least in the short term. The failure of the Kellner jacks at the same location puts the question of why they failed in the first place. The following types of unknown effects remain. Will the cause of the failure affect the riprap, and if so, how? What will happen downstream of the riprap now that the bank is armored? What effects will the placement of additional bank protection in the form of Kellner jacks have on the passage of high flows through the area? The BE states that the projects will not improve the narrowed condition of the channel that presently exists and the jacks are intended to deal with erosion resulting from low flows. What will happen at high flows? There are plantings of riparian trees called for in the project, but the 1995 high water event removed plantings from the area. Will this happen to the new plantings? The new plantings are terms beneficial to the area but if they get washed out, there is no benefit obtained.

Cumulative Effects

Cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of ESA.

The past developments and the effects to the watershed and the wash have been addressed in other sections of this opinion. Development activities in the Beaver Dam Wash watershed and adjacent to the wash itself are not likely to diminish in the near future. This area of Arizona-Nevada-Utah has experienced considerable growth in the last decade and projections for future growth indicate the trend to continue. There may be additional demands for water placed on the water supply in the wash, and new developments in or adjacent to the floodplain may result in additional bank stabilization projects being proposed. These would not be considered cumulative effects unless there was no Federal government involvement through NRCS, the Corps or EPA for section 404, or other agencies. The exact locations and size of new developments or of additions to existing developments cannot be stated with certainty.

As previously mentioned, actions are anticipated for the Virgin River spinedace although the degree of benefit to woundfin and Virgin River chub is unknown.

Conclusion

The purpose of the biological opinion is to determine if the total effect of an agency action on a listed species or designated critical habitat is likely to jeopardize the continued existence of the species and/or destroy or adversely modify its critical habitat. The analysis must review the status of the species throughout its range as well as in the immediate project area. Conditions of the habitats, whether designated critical or not, form an important part of the analysis.

A jeopardy finding must view the effects of the action as additive to the aggregate of all past effects and determine if the addition of these new effects is significant to the survival and recovery of the species. The present status of the woundfin and the Virgin River chub is precarious. Survival of these species is not certain, despite efforts taken for recovery, both species are still declining. Recovery actions will have to involve defining habitat needs for the long term and obtaining those habitats while attempting to retain the existing populations. The proposed action is not likely to involve death or injury to a significant part of the existing population and occupied habitat in the Virgin River would not be directly affected. The existing conditions for woundfin and Virgin River chub habitat in Beaver Dam Wash are not likely to improve because of the project but are more likely to remain the same or decline. The amount of decline cannot be estimated. While there are effects of Beaver Dam Wash that influence the Virgin River, the magnitude of these influences is unclear given present conditions. The present status of the woundfin and Virgin River chub is indicative of species with very limited resources left to absorb effects of new proposed actions. For some types of actions, the jeopardy threshold may have already been reached. The action under consultation, because of the magnitude and

types of effects described in this analysis, has not affected the woundfin or the Virgin River chub to that degree.

After reviewing the current status of the woundfin and Virgin River chub, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the riprap and Kellner jack projects proposed for Beaver Dam Wash by NRCS are not likely to jeopardize the continued existence of these two endangered fish species. This determination is based on existing conditions and information as described in this biological opinion. Future projects of the same type will be assessed against the baseline condition in effect at the time of consultation. That baseline will contain the effects of this action as well as all other Federal actions that have undergone consultation and all State, local and private actions that have occurred in the intervening period.

INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out any otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7 (o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The Service is concerned that NRCS may not be fully aware of the regulatory requirements involved in the incidental take statement. Like reasonable and prudent alternatives for a jeopardy or destruction/adverse modification finding, reasonable and prudent measures and the implementing terms and conditions must be implemented in full. We will be addressing this issue with you in a separate letter.

Take from the Proposed Action

Because of the low probability of either woundfin or Virgin River chub being in the construction area, and that the actual construction is expected to take place out of the water, the amount of take from this portion of the action is likely very low. A higher risk of taking individuals would occur if the live water must be diverted away from a construction area. There is a risk of take from increased sedimentation in the wash during and immediately after the construction and from the release of toxic substances from machinery or other equipment used in the project. The actual amount of take from these effects is not quantifiable.

An assessment of the possible loss of suitable habitats in Beaver Dam Wash and in the Virgin River at and below their confluence due to the project is much more difficult. The wash has been subject to a variety of human activities that have affected normal flows, altered meander patterns and the available floodplain, and caused changes to the channel. As stated in the BE, the present project is dealing with the results of these changes that have manifested themselves in erosion that threatens human developments. It does not change the underlying reasons, but allows them to continue. The amount of take attributable to the proposed action is not quantifiable.

The take resulting from the actual construction is likely to be of short duration. The take resulting from the continued condition of the wash channel is more long term in nature. Subsequent flows that are influenced by the placement of the proposed project features would continue the taking into the future at some amount. The NRCS states in the BE that the effects to future flow events from the proposed project would be almost immeasurable. However, this may not take into account the maintenance of the present channel conditions.

In a biological opinion, the Service is required to provide the action agency with a level of incidental take from the project and a means to assess when that level has been exceeded. Efforts to protect developments adjacent to watercourses and floodplains from high flows compromises the ability of the watercourse to function in a normal fashion. The magnitude, duration and significance of the compromise is difficult if not almost impossible to measure when the action consists of one activity taking place in a system already compromised. Because of the difficulty of measuring the project contribution to conditions in Beaver Dam Wash, no specific level of incidental take can be determined. It is possible to use a surrogate measure for the take and a means to determine when that take has been exceeded. The Service used a similar surrogate method in the 1994 consultation on the two lines of Kellner jacks at the Resort. Using the same standards as previously given to NRCS, the Service believes that incidental take for the project under consultation would be exceeded if:

1. One or more dead woundfin or Virgin River chub are observed at or below the construction site.
2. After subsequent high water events, (a) erosion or deposition of materials has occurred upstream or downstream of the Kellner jacks or riprap that can be linked to the changes to water flow (depth, velocity, direction etc.) caused by placement of the project features and/or (b) new erosion or other damage to the banks protected by the project, or to the integrity or proper operations of the project structure has occurred.

Reasonable and prudent measures

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The NRCS has a continuing duty to regulate the activity covered by this incidental take statement. If the NRCS (1) fails to

which the water access or diversion is needed. This is intended to keep fish from entering the area after the surveys are done.

- b. The length of wash between the barriers will be completely surveyed by a qualified biologist holding all applicable State and Federal permits with experience with the species of concern prior to any construction work to create the diversion or otherwise access the water. Native fish, including the Virgin River spinedace, will be removed from the barriered construction area to suitable habitats up or downstream but as close to the capture site as possible.
 - c. Access to the live water is needed during construction, the barriers must remain in place until all activity is completed. If there is a diversion, the barriers may be removed after the water has been diverted to the new course, provided that water access is not needed for construction.
 - d. The wash reach diverted must be minimized both in length and lateral distance moved. Unless the new course of the water is likely to cause problems for bank erosion downstream or other significant reason, no diversion back to the original course should be done. If a removal is necessary, steps a through c must be followed for the removal.
3. Water for the construction operation will not be taken directly from the wash flows. To minimize the risk of contaminated waters returning to the wash, all grey water used will be disposed of in such a way that it does not return to the wash. No washing or extended (overnight or longer) parking of equipment, storage of materials that could be hazardous to aquatic life, or other related activities will take place with the CWA jurisdictional boundaries.

To implement RPA 3:

1. NRCS will fully coordinate this and any future project with the Corps with the intent of addressing the overall needs of the system as a whole and not on strictly a local scale.
2. A detailed report describing the construction activities and implementation of the terms and conditions will be provided to the Service within three months of the project being completed.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, this minimized level of incidental take is exceeded, such incidental take represents new information requiring review of the reasonable and prudent measures provided. The NRCS must immediately provide an explanation for the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Conservation Recommendations

Section 7(a)(1) of ESA directs Federal agencies to utilize their authorities to further the purposes of ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's section 7 (a)(1) responsibility for the species. No conservation recommendations have been developed for this project.

PROPOSED CRITICAL HABITAT

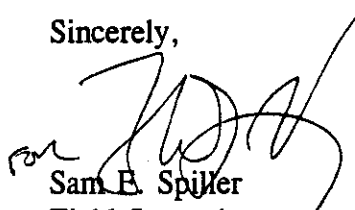
The magnitude of effects from the proposed action on the proposed critical habitat in the Virgin River is not sufficient to warrant a finding of destruction/adverse modification. Formal conference is not required.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If there are any questions regarding this biological opinion, please contact Ted Cordery or Lesley Fitzpatrick.

Sincerely,


Sam B. Spiller
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (GM:AZ)
Field Supervisor, Fish and Wildlife Service, Salt Lake City, UT

Director, Arizona Game and Fish Department, Phoenix, AZ
Regulatory Branch, Corps of Engineers, Phoenix, AZ

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